

## Claims

1. A stereophonic sound reproducing system comprising:

a stereophonic sound reproducing apparatus for providing a sound field space having the realism of a live performance to the listener by amplifying a plurality of input stereophonic sound signals by speakers corresponding to the stereophonic sound signals;

at least a pair of right and left main speakers installed forward of the listening position and amplifying main signals as stereophonic sound signals corresponding to the speakers; and

an integral surround speaker obtained by integrally forming a left surround speaker for generating the stereophonic sound by amplifying a surround signal as a stereophonic sound signal of a left-side component with respect to the listening position as a reference, and a right surround speaker for generating the stereophonic sound by amplifying a surround signal as the stereophonic sound signal of a right-side component with respect to the listening position as a reference,

wherein the stereophonic sound reproducing apparatus comprises:

signal adjusting means, in the case where the integral surround speaker is installed in a position that makes arrangement asymmetrical with respect to the listening position as a center, for adjusting the frequency characteristic of a

surround signal of a component of the side different from the side on which the integral surround speaker is deviated and installed on the basis of a transfer function for creating a sound image in a predetermined listening position;

adding means for adding a component of at least part of the adjusted surround signal to a main signal of the component on the same side as that of the adjusted surround signal; and

output means for outputting the resultant main signal to the corresponding main speaker and outputting at least part of the surround signal whose frequency characteristic is adjusted to the corresponding surround speaker.

2. The stereophonic sound reproducing system according to claim 1,

wherein the signal adjusting means adjusts a frequency characteristic of each of surround signals of right-side and left-side components by using the transfer function every right-side and left-side component.

3. The stereophonic sound reproducing system according to claim 1 or 2,

wherein the signal adjusting means adjusts a frequency characteristic of a surround signal by using a head-related transfer function (HRTF) as the transfer function for generating a sound image in a listening position in a predetermined space.

4. The stereophonic sound reproducing system according to claim 3,

wherein the signal adjusting means preliminarily calculates a level ratio between a frequency characteristic in a position in which the integral speaker system is installed deviated from a listening position as a center and a frequency characteristic in a position in which the integral speaker system is installed using the listening position as a center by using a head-related transfer function (HRTF) as a transfer function for generating a sound image in the listening position in a predetermined space, and

adjusts the frequency characteristic of a surround signal on the basis of the calculated level ratio.

5. The stereophonic sound reproducing system according to any one of claims 1 to 4,

wherein the adding means multiplies the adjusted surround signal with a predetermined coefficient and adding the resultant surround signal to the main signal.

6. The stereophonic sound reproducing system according to any one of claims 1 to 5,

wherein the integral speaker system is installed on a side of a listening position.

7. A stereophonic sound reproducing system comprising:

a stereophonic sound reproducing apparatus for providing a sound field space having the realism of a live performance to the listener by amplifying a plurality of input stereophonic sound signals by speakers corresponding to the stereophonic sound signals;

at least a pair of right and left main speakers installed forward of the listening position and amplifying main signals as stereophonic sound signals corresponding to the speakers; and

an integral surround speaker obtained by integrally forming a left surround speaker for generating the stereophonic sound by amplifying a surround signal as a stereophonic sound signal of a left-side component with respect to the listening position as a reference, and a right surround speaker for generating the stereophonic sound by amplifying a surround signal as the stereophonic sound signal of a right-side component with respect to the listening position as a reference,

wherein the stereophonic sound reproducing apparatus comprises:

generating means, in the case where the integral surround speaker is installed in a position that makes arrangement asymmetrical with respect to the listening position as a center, for generating a differential signal by subtracting a surround signal of a component on the side on which integral surround speaker is deviated and installed from a surround signal of a component of the side different from the side on which the integral

surround speaker is deviated and installed;

first computing means for performing computing process of adding the generated differential signal to the surround signal of the component on the side different from the side on which the integral surround speaker is deviated and installed;

second computing means for performing computing process of subtracting the generated differential signal from the surround signal of the component on the same side as the side on which the integral surround speaker is deviated and installed;

adding means for adding at least part of each of the surround signals subjected to the computing process to a main signal of a component on the same side; and

output means for outputting the resultant main signal to the corresponding main speaker and outputting at least part of the surround signal subjected to the differential signal computing process to the corresponding surround speaker.

8. A stereophonic sound reproducing system comprising:

a stereophonic sound reproducing apparatus for providing a sound field space having the realism of a live performance to the listener by amplifying a plurality of input stereophonic sound signals by speakers corresponding to the stereophonic sound signals;

at least a pair of right and left main speakers installed forward of the listening position and amplifying main signals as stereophonic sound signals corresponding to the speakers;

and

an integral surround speaker obtained by integrally forming a left surround speaker for generating the stereophonic sound by amplifying a surround signal as a stereophonic sound signal of a left-side component with respect to the listening position as a reference, and a right surround speaker for generating the stereophonic sound by amplifying a surround signal as the stereophonic sound signal of a right-side component with respect to the listening position as a reference,

wherein the stereophonic sound reproducing apparatus comprises:

generating means, in the case where the integral surround speaker is installed in a position that makes arrangement asymmetrical with respect to the listening position as a center, for generating a delay component having predetermined delay time with respect to a surround signal of a component on the side different from the side on which integral surround speaker is deviated and installed;

computing means for performing computing process of adding the generated delay component to the surround signal used at the time of generating the delay component;

adding means for adding a component of at least part of the surround signal subjected to the computing process to a main signal of a component on the same side as that of the surround signal subjected to the computing process; and

output means for outputting the resultant main signal to

the corresponding main speaker and outputting at least part of the surround signal to which the delay component is added to the corresponding surround speaker.

9. A stereophonic sound reproducing system comprising:  
a stereophonic sound reproducing apparatus for providing a sound field space having the realism of a live performance to the listener by amplifying a plurality of input stereophonic sound signals by speakers corresponding to the stereophonic sound signals;

at least a pair of right and left main speakers installed forward of the listening position and amplifying main signals as stereophonic sound signals corresponding to the speakers;  
and

an integral surround speaker obtained by integrally forming a left surround speaker for generating the stereophonic sound by amplifying a surround signal as a stereophonic sound signal of a left-side component with respect to the listening position as a reference, and a right surround speaker for generating the stereophonic sound by amplifying a surround signal as the stereophonic sound signal of a right-side component with respect to the listening position as a reference,

wherein the stereophonic sound reproducing apparatus comprises:

generating means, in the case where the integral surround speaker is installed in a position that makes arrangement

asymmetrical with respect to the listening position as a center, for generating a differential signal by subtracting a surround signal of a component on the side on which integral surround speaker is deviated and installed from a surround signal of a component of the side different from the side on which the integral surround speaker is deviated and installed;

generating means for generating a delay component having predetermined delay time with respect to the generated differential signal;

first computing means for performing computing process of adding the generated delay component to the surround signal of the component on the side different from the side on which the integral surround speaker is deviated and installed;

second computing means for performing computing process of subtracting the generated delay component from the surround signal of the component on the same side as the side on which the integral surround speaker is deviated and installed;

adding means for adding at least part of each of the surround signals subjected to the computing process to a main signal of a component on the same side; and

output means for outputting the resultant main signal to the corresponding main speaker and outputting at least part of the surround signal subjected to the delay component computing process to the corresponding surround speaker.

10. A stereophonic sound reproducing apparatus for providing



a sound field space having the realism of a live performance to the listener by amplifying a plurality of input stereophonic sound signals by speakers corresponding to the stereophonic sound signals,

in the case of amplifying sound by at least a pair of right and left main speakers installed forward of the listening position and amplifying main signals as stereophonic sound signals corresponding to the speakers, and an integral surround speaker obtained by integrally forming a left surround speaker for generating the stereophonic sound by amplifying a surround signal as a stereophonic sound signal of a left-side component with respect to the listening position as a reference, and a right surround speaker for generating the stereophonic sound by amplifying a surround signal as the stereophonic sound signal of a right-side component with respect to the listening position as a reference, and installing the integral surround speaker in a position that makes arrangement asymmetrical with respect to the listening position as a center,

the apparatus comprising:

signal adjusting means for adjusting the frequency characteristic of a surround signal of a component of the side different from the side on which the integral surround speaker is deviated and installed on the basis of a transfer function for creating a sound image in a predetermined listening position;

adding means for adding a component of at least part of the adjusted surround signal to a main signal of the component

on the same side as that of the adjusted surround signal; and  
output means for outputting the resultant main signal to the corresponding main speaker and outputting at least part of the surround signal whose frequency characteristic is adjusted to the corresponding surround speaker.

11. A stereophonic sound reproducing apparatus for providing a sound field space having the realism of a live performance to the listener by amplifying a plurality of input stereophonic sound signals by speakers corresponding to the stereophonic sound signals,

in the case of amplifying sound by at least a pair of right and left main speakers installed forward of the listening position and amplifying main signals as stereophonic sound signals corresponding to the speakers, and an integral surround speaker obtained by integrally forming a left surround speaker for generating the stereophonic sound by amplifying a surround signal as a stereophonic sound signal of a left-side component with respect to the listening position as a reference, and a right surround speaker for generating the stereophonic sound by amplifying a surround signal as the stereophonic sound signal of a right-side component with respect to the listening position as a reference, and installing the integral surround speaker in a position that makes arrangement asymmetrical with respect to the listening position as a center,

the apparatus comprising:

generating means for generating a differential signal by subtracting a surround signal of a component on the side on which integral surround speaker is deviated and installed from a surround signal of a component of the side different from the side on which the integral surround speaker is deviated and installed;

first computing means for performing computing process of adding the generated differential signal to the surround signal of the component on the side different from the side on which the integral surround speaker is deviated and installed;

second computing means for performing computing process of subtracting the generated differential signal from the surround signal of the component on the same side as the side on which the integral surround speaker is deviated and installed;

adding means for adding at least part of each of the surround signals subjected to the computing process to a main signal of a component on the same side; and

output means for outputting the resultant main signal to the corresponding main speaker and outputting at least part of the surround signal subjected to the differential signal computing process to the corresponding surround speaker.

12. A stereophonic sound reproducing apparatus for providing a sound field space having the realism of a live performance to the listener by amplifying a plurality of input stereophonic sound signals by speakers corresponding to the stereophonic sound

signals,

in the case of amplifying sound by at least a pair of right and left main speakers installed forward of the listening position and amplifying main signals as stereophonic sound signals corresponding to the speakers, and an integral surround speaker obtained by integrally forming a left surround speaker for generating the stereophonic sound by amplifying a surround signal as a stereophonic sound signal of a left-side component with respect to the listening position as a reference, and a right surround speaker for generating the stereophonic sound by amplifying a surround signal as the stereophonic sound signal of a right-side component with respect to the listening position as a reference, and installing the integral surround speaker in a position that makes arrangement asymmetrical with respect to the listening position as a center,

the apparatus comprising:

generating means for generating a delay component having predetermined delay time with respect to a surround signal of a component on the side different from the side on which integral surround speaker is deviated and installed;

computing means for performing computing process of adding the generated delay component to the surround signal used at the time of generating the delay component;

adding means for adding a component of at least part of the surround signal subjected to the computing process to a main signal of a component on the same side as that of the surround

signal subjected to the computing process; and

output means for outputting the resultant main signal to the corresponding main speaker and outputting at least part of the surround signal to which the delay component is added to the corresponding surround speaker.

13. A stereophonic sound reproducing apparatus for providing a sound field space having the realism of a live performance to the listener by amplifying a plurality of input stereophonic sound signals by speakers corresponding to the stereophonic sound signals,

in the case of amplifying sound by at least a pair of right and left main speakers installed forward of the listening position and amplifying main signals as stereophonic sound signals corresponding to the speakers, and an integral surround speaker obtained by integrally forming a left surround speaker for generating the stereophonic sound by amplifying a surround signal as a stereophonic sound signal of a left-side component with respect to the listening position as a reference, and a right surround speaker for generating the stereophonic sound by amplifying a surround signal as the stereophonic sound signal of a right-side component with respect to the listening position as a reference, and installing the integral surround speaker in a position that makes arrangement asymmetrical with respect to the listening position as a center,

the apparatus comprising:

generating means for generating a differential signal by subtracting a surround signal of a component on the side on which integral surround speaker is deviated and installed from a surround signal of a component of the side different from the side on which the integral surround speaker is deviated and installed;

generating means for generating a delay component having predetermined delay time with respect to the generated differential signal;

first computing means for performing computing process of adding the generated delay component to the surround signal of the component on the side different from the side on which the integral surround speaker is deviated and installed;

second computing means for performing computing process of subtracting the generated delay component from the surround signal of the component on the same side as the side on which the integral surround speaker is deviated and installed;

adding means for adding at least part of each of the surround signals subjected to the computing process to a main signal of a component on the same side; and

output means for outputting the resultant main signal to the corresponding main speaker and outputting at least part of the surround signal subjected to the delay component computing process to the corresponding surround speaker.